

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

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WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/JP2004/008473

International filing date (day/month/year)
10.06.2004

Priority date (day/month/year)
13.06.2003

International Patent Classification (IPC) or both national classification and IPC
H04B10/12

Applicant
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1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/JP2004/008473

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material:
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing:
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

WRITTEN OPINION OF
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/JP2004/008473

Box No. II Priority

1. ☒ The following document has not been furnished:

- ☒ copy of the earlier application whose priority has been claimed (Rule 43bis.1 and 66.7(a)).
☐ translation of the earlier application whose priority has been claimed (Rule 43bis.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43bis.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. Additional observations, if necessary:

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-31,34,35
	No: Claims	32,33
Inventive step (IS)	Yes: Claims	1-31,35
	No: Claims	32,33,34
Industrial applicability (IA)	Yes: Claims	1-35
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item V.

1 The following documents are referred to in this communication

- D1 : EP 1 107 487 A (JDS UNIPHASE INC) 13 June 2001 (2001-06-13)
D2 : US 2002/012495 A1 (FUSE MASARU ET AL) 31 January 2002 (2002-01-31)
D3 : EP 0 403 991 A (HARMONIC LIGHTWAVES INC) 27 December 1990 (1990-12-27)
D4 : SMITH G H ET AL: "OVERCOMING CHROMATIC-DISPERSION EFFECTS IN FIBER-WIRELESS SYSTEMS INCORPORATING EXTERNAL MODULATORS" IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES, IEEE INC. NEW YORK, US, vol. 45, no. 8, PART 2, 1 August 1997 (1997-08-01), pages 1410-1415, XP000696770 ISSN: 0018-9480
D5 : US 5 940 196 A (PIEHLER DAVID ET AL) 17 August 1999 (1999-08-17)

2 INDEPENDENT CLAIM 32

2.1 The present application does not meet the criteria of **Article 33(1) PCT**, because the subject-matter of claim 32 is not new in the sense of **Article 33(2) PCT**.

Document D1 discloses (the references in parenthesis applying to this document) a control station for optically transmitting a radio frequency signal to a base station (column 5, lines 52-53), the control station comprising a light source for outputting an optical signal having a wavelength of λ_1 (column 5, lines 51-52); and an optical intensity modulation section for modulating an intensity of the optical signal outputted from the light source with the radio frequency signal, and generating two phase-conjugated optical signals based on the optical signal having its intensity modulated (column 5, lines 53-58).

3 DEPENDENT CLAIMS 33,34

3.1 Dependent claim 33 does not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty (Article 33(2) and (3) PCT). The additional features of claim 33 are disclosed in document D1 (paragraphs 14-16)

3.2 Dependent claim 34 does not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step (Article 33(2) and (3) PCT). The additional features of claim 34 are disclosed in document D3 (page 6, lines 56-57) in combination with D1.

4 INDEPENDENT CLAIM 1

4.1 Document D1, which is considered to represent the most relevant state of the art, discloses (the references in parenthesis applying to this document): a radio frequency optical transmission system for optically transmitting a radio frequency signal (column 5, lines 52-53), the system comprising a control station for generating two phase-conjugated optical signals having their intensities modulated with the radio frequency signal, and transmitting the two phase-conjugated optical signals in a predetermined transmission form via an optical transmission path (column 4, lines 12-31); and at least one base station for receiving the two phase-conjugated optical signals transmitted in the predetermined transmission form from the control station via the optical transmission path (column 5, lines 14-27), ~~and selectively processing one of the received two phase-conjugated optical signals which has a greater signal power intensity.~~

From this, the subject-matter of independent claim 1 differs in that the base station selectively processes one of the received two phase-conjugated optical signals which has a greater signal power intensity.

4.1.1 The subject-matter of claim 1 is therefore novel (Article 33(2) PCT)

The problem to be solved by the present invention may be regarded as: How to receive an optically transmitted radio frequency signal having a greater power intensity without requiring considerable high adjustment accuracy.

4.1.2 The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons: There is no identification neither in D1 nor in any other document of a combination solving this problem in this particular way.

4.1.3 Claims 2-31 are dependent on claim 1 and as such also meet the requirements

of the PCT with respect to novelty and inventive step.

5 INDEPENDENT CLAIM 35

5.1 Claim 35 describes a method comprising the steps corresponding to the technical features described in claim 1. Therefore, the same reasons apply to claim 1, and thus this claim is also novel (**Article 33(2) PCT**)

Re Item VIII.

1. The application does not meet the requirements of **Article 6 PCT**, because claim 1 is not clear.

1.1 The term "phase-conjugated" used in claims 1,2,7,12,32,35 refers to a particular technical feature in the field of optical communications, different from the meaning in this application. This term therefore has no well-recognised meaning and leaves the reader in doubt as to the meaning of the technical features to which it refers, thereby rendering the definition of the subject-matter of said claim unclear, **Article 6 PCT**. It is understood that the correct wording in the field is "180° out of phase", as it is indicated by the applicant himself in the Description, page 23, lines 5-6.

1.2 Claim 1 does not meet the requirements of **Article 6 PCT** in that the matter for which protection is sought is not clearly defined. The claim attempts to define the subject-matter in terms of the result to be achieved, which merely amounts to a statement of the underlying problem, without providing the technical features necessary for achieving this result. In particular, said claim describes a "control station for generating two phase-conjugated optical signals", but it does not provide the technical features to generate them. As it is understood from the Description page 22 line 12 - page 23 line 14 and from claim 2, the "light source" and the "optical intensity modulation section" are the means to generate said two optical signals.

Moreover, it is clear from said cited paragraphs that the "light source" and the "optical intensity modulation section" are essential to the definition of the invention. Since independent claim 1 does not contain these features it does not meet the requirement following from Article 6 PCT taken in combination with Rule 6.3(b) PCT that any

independent claim must contain all the technical features essential to the definition of the invention.

1.3 Independent claims 1,32,35 are not in the two-part form in accordance with **Rule 6.3(b) PCT**, which in the present case would be appropriate, with those features known in combination from the prior art (document D1) being placed in the preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).

1.4 The features of the claims 1-35 are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).